

Master Catalog
2015/2016



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Future Technologies



FT

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Future Technologies
Vacuum and Fluids Charge Masters



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Company Profile

FT Future Technologies S.r.l. was founded in 1995, basing on more than twenty years of professional skills of its associates and managers about vacuum technology, filling of refrigerants, brake fluid circuits, industrial automation, data processing and communications.

FT headquarters and new production 1000 sqm facility are located in Castel del Piano, a town of the Mount Amiata close to Siena and Florence cities.

FT is the ideal partner for Vacuum and Refrigerant treatment in the Cold Industry. All equipments and related services are completely designed inside our facility. Customer Engineering is at best standardized levels thanks to its continuous Research and Develop that lead to improve the application related to the specific design requested from all customers.

Hundreds of FT equipments are now working 24h per day, 365 days per year in all worldwide customers, with high affidability, performances and quality of cycle production.

FT specialized technicians are every ready to reach each part of the world to support our directional customers, starting from the offer engineering up to the commissioning. And all our products and services have improved the production lines of our Customers.

Our key words: *Refrigerants Pump and Charging machines -
Ecologic and Hydrocarbons Refrigerant treatment -
Design and integration of production lines - Installation and startup -
Control Process Automation - Maintenance and Technical Support*



Solutions

Refrigerant charging units, Refrigerant transfer pumps, Preliminary evacuation units, Smart HC Monitoring systems, Tight tests Stations with tracer gas, Charging Units for leak detection, Refrigerant recovery devices, Safety test equipment, Functional test equipments

Main Activities

Line engineering and integration, Production and assembling, Customer pre-sale support, Commissioning and start-up, Technical support and maintenance, Basic and Specialized level Training, Special customization on demand, Customer production optimization, Continuous Research & Development, Quality production procedures



Main Customer Apps

Domestic refrigerators and freezers
Professional refrigerators
Refrigerators/food sales point
Refrigerating units in transportation
Machinery for ice cream
Chillers, Dehydrating systems
Domestic air conditioning/heat pumps
Car/truck air conditioning systems
Centralised air conditioning station

Main References



Main References



Actron Air ** Agritalia ** Ali ** Asiri ** Autoclima ** Barjays Steel ** Bev Service
 Blue Box ** BSH ** Cannon Far East ** Climaveneta ** Condor B ** Cosmetal ** De Blasi
 Denso ** Effcold ** Electrolux ** Emerson Network Power ** Energy Panel ** Eurocryor
 Evobus ** Fas International ** Fiat Power Train ** FPG ** Fresh ** Friemo ** Frigeria
 Frigogelo ** Frigomar ** Frigomat ** Frigomeccanica ** Frigomeuble ** Frigosystem
 Frimec ** Friulinox ** G.I. Industrial Holding ** Green One Tec
 Hangzhou Yin Du Kitchen ** Hafei Meiling ** Hafei Rongshida ** Sanyo Electric ** Hidros
 Hiere ** Iarp ** IDM ** IFI ** Iglu Cold Systems ** Indel B ** Indel Webasto Marine
 Indesit Company ** Irinox ** ISA ** Italproget ** Italbedis ** Kalvin ** Lennox
 Longoni ** Mercedes-Benz Türk ** Michelini Automotive ** Midea ** Misa ** Modular ** MTA
 Novafrigo ** Oscartelle ** Parker Hannifin ** Power Cool Equipments
 PPJ Engineering ** R&I Electrical Appliances ** RC Group ** Refrig Co Industrial
 Rheem ** Rittal Corporation ** Rittal Electro-Mechanical Technology ** Rittal GmbH
 Rivacold ** Schneider Electric ** Stride Tool ** Tecnoclima ** Tecnogas ** Teco
 Toyota South Africa ** Vitfrigo ** Vulkan Lökning ** Walbit Manufacturing
 Wuxi Vulkan Technologies ** Zanotti



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Vacuum and Refrigerant Charging

The FT Vacuum and Refrigerants charging Units represent for the worldwide cold industry market an essential reference for the production of any industrial or domestic device that works with Refrigerant Gases.

The FT Vacuum and Refrigerants charging Units are designed to meet the highest standards of quality and performance that modern industry can require.

The main function of the vacuum and charging unit is to perform and control the vacuum inside the refrigeration circuits, and then make the refrigerant charge according with the design requirements of the constructor. For this process the FT Vacuum and Refrigerant charging Units perform automatic and configurable functions that are fully integrated to the production automation of the Customer Industry, leading a significant contribution to the quality of it.

The FT Vacuum and Refrigerants charging Units are continuously updated in terms of design according to the international guidelines on the refrigerant gases use. Therefore, they are ready to be used with modern and future refrigerants so to fulfill a wide range of processes during the entire life of the unit.

Who uses the FT Vacuum and Refrigerants charging Units, has the ability to integrate into the production schedule relevant information of each cycle on their tools in order to have accurate report of each job.

All FT Vacuum and Refrigerants charging Units are available with touch panel controls operated by modern operating systems that enable an intelligent display of processing cycles a fast reporting directly downloadable in remote PCs production lines and a telecare post-sale services.

FT is able to find "ad hoc" solutions for the customer so as to satisfy any requests for personalizations.



Teide TTD

TEIDE TTD is a compact system for the evacuation* and the injection of refrigerant fluids . It has been designed to perform excellent works, reliable, easily portable and suitable to work with any cooling fluid of normal use (HCFC and HFC refrigerants , including R410A).

TEIDE TTD is available, on demand, with an integrated printer to record results and performances of cycle works run.



- High flexibility
- Ready for the most common refrigerants including R410A
- Electromagnetic Head Injector control VORTFILLER
- Safety in the working area

Main using applications

- Professional Refrigeration
- Refrigerated show cases and cooling cabinets
- Automatic food and beverage dispenser machines
- Refrigerating units for transportation
- Ice-cream machines
- Dehumidifiers
- Chillers and centralized air conditioning stations
- Industrial refrigeration
- Electrical cabinet coolers
- Domestic air conditioners
- Refrigerators and air conditioners for boats or caravans
- IT coolers
- Compressed air driers
- Condensing units

(only refrigerant charging)
(only refrigerant charging)

* with optional vacuum pump not provided with the unit. For vacuum pump delivery please contact FT sales Service

Technical Characteristics

Injectors/Type	1/Vortiller
Injector length	2,5 m
Refrigerant metering systems	1
Charging capacity	up to 10 kg
Charging speed	up to a 10 g/s (25 g/s with RTP and accumulator)
Charging accuracy	< 200 g: ± 1 g > 200 g: $\pm 0,5\%$
Heating belt	Available as optional
Injector connection	1/4" Hansen F (ISO 7241B)
Connection to the refrigerant supply line	1/4" Hansen M (ISO 7241B)
Connection to the external vacuum pump	DN15KF
Pirani vacuum sensor	Integrated
On-board alarms	3 light alarms (green/white/red)
Acoustic alarm	Integrated, activable via software
Programmable work cycles	50
Connection to external PC	RS232
Control unit	EC709
Working temperature	5 °C .. 45 °C
Power Supply	230 V – 50/60 Hz – 1ph+terra
Dimensionis (L x D x H)	560 x 420 x 300 mm
Weight	~20 kg

Optional features and devices

DCA (Data Collector Application per RS232/USB)
Refrigerant metering system up to 35 g/s (with RTP and accumulator)
Heating Belt 400W RHP20
Refrigerant tank connection kit
Vacuum connection kits
Charging only machine on request
Automatic working cycle selection performed by barcode reader
Printer



Rockall Jr

ROCKALL Jr is a modular evacuation and high productivity charging station for HFC and HCFC refrigerants.

ROCKALL Jr is ideal for medium throughput production lines of domestic and commercial refrigerators/freezers, air conditioners, heat pumps, liquid coolers where amounts of medium size of refrigerant have to be charged.

- Compact and light weight
- Charging capacity: up to 10 kg
- Charging speed: up to 10 g/s with heating belt (up to 25 g/s with RTP and accumulator)
- High charging accuracy: 0,5% of the charged amount
- Digital refrigerant metering system
- **Available with integrated Refrigerant transfer Pump equipped with volumetric metering system**
- Built-in vacuum pump (8,5 m³/h @ 50 Hz, different on request)
- TOUCH keyboard with LCD display
- Up to 50 programmable work cycles
- Microprocessor controlled
- Built in according to the European Machinery Directive, Safety standards CE marked



Main using applications

- Professional Refrigeration
- Refrigerated show cases and cooling cabinets
- Automatic food and beverage dispenser machines
- Refrigerating units for transportation
- Ice-cream machines
- Dehumidifiers
- Electrical cabinet coolers
- Domestic air conditioners
- Refrigerators and air conditioners for boats or caravans
- IT coolers
- Compressed air driers
- Condensing units



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Technical Characteristics

Injectors/Type	1/Vortfiller
Injector length	2,5 m
Refrigerant metering systems	1
Charging capacity	up to 10 kg
Charging speed	up to a 10 g/s (25 g/s with RTP and accumulator)
Charging accuracy	< 200 g: ± 1 g > 200 g: $\pm 0,5\%$
Heating belt	Available as optional RHP20, 400 W
Injector connection	1/4" Hansen F (ISO 7241B)
Connection to the refrigerant supply line	1/4" Hansen M (ISO 7241B)
Nominal Vacuum pump rate	8,5 m ³ /h
Pirani vacuum sensor	Integrated
On-board alarms	3 light alarms (green/white/red)
Acoustic alarm	not available as standard delivery
Programmable work cycles	50
Connection to external PC	not available as standard delivery
Control unit	EC709
Working temperature	5 °C .. 45 °C
Power Supply	230 V – 50/60 Hz – 1ph+terra
Dimensions (L x D x H)	1500 x 600 x 850 mm
Weight	~120 kg

Optional features and devices

DCA (Data Collector Application per RS232/USB)
Light and acoustic alarm
On Board RTP kit including suction line, protection filter, 0,7 l accumulator
Customizable VORTFILLER injector length
DC.16D vacuum pump
PHV20 vacuum pump with TMF36 oil mist filter
Automatic working cycle selection performed by bar code reader
Refrigerant metering system for up to 35 g/s with RTP and accumulator
Printer
VORTFILLER 3/8" Hansen, 2,5 m



Rockall -UNO /-DUE

ROCKALL-UNO /-DUE is a modular evacuation and high productivity charging station for HFC and HCFC refrigerants.

ROCKALL -UNO /-DUE is ideal for medium/high throughput production lines of domestic and commercial refrigerators/freezers, air conditioners, heat pumps, liquid coolers where high amounts of refrigerant have to be charged.

- Compact and light weight
- Charging capacity: up to 10 kg
- Charging speed: up to 10 g/s with heating belt (up to 65 g/s in HS version)
- High charging accuracy: 0,5% of the charged amount
- Digital refrigerant metering system
- **Available with integrated Refrigerant transfer Pump equipped with volumetric metering system***
- Built-in vacuum pump (17 m³/h @ 50 Hz, different on request)
- TOUCH keyboard with LCD display
- Up to 200 programmable work cycles
- Microprocessor controlled
- Built in according to the European Machinery Directive, Safety standards CE marked



Main using applications

- Professional Refrigeration
- Refrigerated show cases and cooling cabinets
- Automatic food and beverage dispenser machines
- Refrigerating units for transportation
- Ice-cream machines
- Dehumidifiers
- Centralized Conditioning stations and refrigerators
- Electrical cabinet coolers
- Domestic air conditioners
- Refrigerators and air conditioners for boats or caravans
- IT coolers
- Compressed air driers
- Condensing units

* Only Rockall UNO version



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Technical Characteristics

	Rockall UNO	Rockall DUE
Injectors/Type	1/Vortfiller+	2/Vortfiller+
Injector length	3,3 m	
Refrigerant metering systems	1	2
Charging capacity	up to 10 kg	
Charging speed	up to 35 g/s	
Charging accuracy	< 200 g: ± 1 g > 200 g: $\pm 0,5\%$	
Injector connection	1/4" Hansen F (ISO 7241B)	
Refrigerant supply connection	1/4" Hansen M (ISO 7241B)	
Refrigerants	HFC, HCFC	
Working compressed air	6+7 bar not lubricated	
On-board alarms	3 light alarms (green/white/red) on column	
Heating belt	option	
Programmable work cycles	fino a 200	
Nominal Vacuum pump rate	17 m ³ /h	
Control unit	EC709	
Working temperature	5 °C ... 45 °C	
Power Supply	400 V – 50/60 Hz – 3ph+N+earth	
Dimensions(L x D x H)	1500x600x850 mm / depending on configuration	
Weight	~120 kg	

Optional features and devices

Light and acoustic alarm
DCA (Data Collector Application for RS232/USB)
On Board RTP kit including suction line, protection filter, 0,7 l accumulator
Only vacuum extension Injector Head
ISSO Injector extension
ISSO Injector with 1/4" SAE Auto connector
ISSO Injector with 1/4" Schrader connector
ISSO Injector with 3/8" Hansen connector
Automatic working cycle selection performed by bar code reader
Printer
Only Vacuum Heads with 1/4" Hansen or 1/4" SAE Schrader connections



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Rockall HS

ROCKALL HS is a modular evacuation and high productivity charging station for HFC and HCFC refrigerants.

The unit represent the TOP model of the Rockall Series.

The unit can be supplied with two injectors (**ROCKALL HS /DUE**) and it can be configured to satisfy high refrigerant charging speed according to the customer requirements (**XS** version).

ROCKALL HS is ideal for high throughput production lines of domestic and commercial refrigerators/freezers, air conditioners, heat pumps, liquid coolers where high amounts of refrigerant have to be charged.

- Compact and light weight
- Weight charging capacity: up to 100 kg
- Charging speed: 65 g/s
- High charging accuracy: 0,5% of the charged amount
- Digital refrigerant metering system
- Built-in vacuum pump (17 m³/h @ 50 Hz, different on request)
- TOUCH keyboard with LCD display
- **SMART Operative System on demand with Graphic Display and Interactive reporting (on demand)**
- Up to 200 programmable work cycles
- Built in according to the European Machinery Directive, Safety standards CE marked



Main using applications

- Domestic refrigerators and deep freezers
- Professional Refrigeration
- Refrigerated show cases and cooling cabinets
- Automatic food and beverage dispenser machines
- Refrigerating units for transportation
- Ice-cream machines
- Dehumidifiers
- Chillers and centralized air conditioning stations
- Industrial refrigeration
- Electrical cabinet coolers
- Domestic air conditioners
- Car, bus, truck, tractors air conditioners
- Refrigerators and air conditioners for boats or caravans
- IT coolers
- compressed air driers
- Condensing units



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Technical Characteristics

	Rockall HS UNO	Rockall HS DUE	Rockall HS Test Gas	Rockall XS
Injector/Type	1/ISSO	2/ISSO	1/ISSO	1 o 2/ISSO
Injector length	3,3m			
Refrigerant metering systems	1	2	1	1 o 2
Tracer Gases System	-	-	1, up to 20 bar test	-
Charging capacity	up to 100kg			
Charging speed	up to 65 g/s			up to 260 g/s
Charging accuracy	< 400 g: ± 2 g > 400 g: $\pm 0,5\%$			< 1000 g: ± 5 g > 1000 g: $\pm 0,5\%$
Power supply	400 V – 50 Hz – 3ph+N+earth			
Injector connection	1/4" Hansen F (ISO 7241B)	1/4" Schrader F	1/4" Hansen F	1/4" Hansen F
Refrigerant supply connection	1/4" Hansen M (ISO 7241B)	1/4" Schrader M	1/4" Hansen M	1/4" Hansen M
Vacuum pump rate	17 m ³ /h			
Programmable work cycles	200			400
Control unit	EC709			
Working temperature	5 + 45 °C			
Power consumption	0,9 kW			
Operative compressed air	6 + 7 bar - filtered - not lubricated			
Dimensions(L x D x H)/Weight	1500 x 600 x 850 mm / 140 kg			

Optional features and devices

Light and Acoustic Alarm
DCA (Data Collector Application for RS232/USB)
Only vacuum extension Injector Head
ISSO Injector extension
ISSO Injector with 1/4" SAE Auto connector
ISSO Injector with 1/4" Schrader connector
ISSO Injector with 3/8" Hansen connector
Automatic working cycle selection performed by bar code reader
Printer
Only Vacuum Heads with 1/4" Hansen or 1/4" SAE Schrader connections



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HC Refrigerants treatment Systems

About Hydrocarbons (HC)

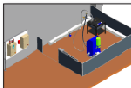
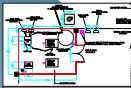
The interest and the application for Hydrocarbons (HC) refrigerants is growing more and more, especially now that the impact of global warming refrigerants has acquired an important role in the industry of refrigeration and air conditioning.

Natural refrigerants ecological as the HC (Propane and Isobutane R600a R290), ammonia and carbon dioxide are now all available as mature technologies for most applications.

It is widely recognized that hydrocarbons HC refrigerants are excellent in terms of performance, but also that they have negatives features for their environmental use in terms of flammability.

FT srl is sensitive to the subject of the design of systems for the industrial treatment of HC and has developed over the years a range of products and projects dedicated exclusively to the treatment of this class of Refrigerants. This range of products is achieved by following suitable criteria for safety in the workplace for potentially explosive environments in which they are taken as a source of explosion due to involuntary refrigerant leaks during the manufacturing processes of refrigerators.

FT srl realizes specialized secure systems for testing, evacuation and charging with HC refrigerants of the refrigerant circuits, providing a special commissioning of appropriate working areas equipped with auxiliary forced ventilation systems and monitored by means of leak Gas sensors detecting leaks to safeguard the safety of the operator according to existing rules on the prevention of possible explosion.





Description of a typical FT HC Refrigerants treatment System

The equipment for the final vacuum and the charge of HC refrigerants are realized according to ATEX Directive 99/92 / EC, inside a proper workspace for refrigeration units to be loaded with flammable gas R290 or R600a. Within that area flames or wells are not allowed, and smoking is prohibited. The area is delimited by walls and ventilation ducts. For security reasons, sources of potential danger to the fire ignition should be placed not less than 2-3 meters from the perimeter of the work area.

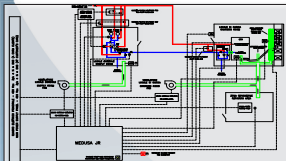
Usually a bounded working area is provided by an enclosure in which, the cooling units to be treated are moved inside through a sliding door. The same door is the access point to the work area by the staff engaged. The door can be controlled by microswitch timed.

The size of the charging Area is approximately 20 m², with height of 1 meter from the floor and is enclosed by fireproof panels, which are also supplied by FT srl.

On the internal perimeter of the working area, a supply of forced ventilation is installed, which provides for the necessary change of air, so as to keep under control the concentration of hazardous gas. Inside of this area work it is placed and fixed the HC vacuum and charging machine with one / two injectors.

The refrigerant tank in use, can be installed inside another area and it can deliver the refrigerant to the charging station by means of Refrigerant Transfer Pump systems.

The devices to check the the environmental safety are installed in the vicinity of the outer walls of the charging area, while the ventilation unit with variable speed is located on the wall perimeter of the plant, in correspondence of the charging area.



Full layout example of a FT HC systems installation

FT System components for HC refrigerants treatment

FT srl can supply a full and customizable components pack that realize a full HC system.

Every FT srl component system respects the Electrical security normative (EN 60529, EN60204-1), Hydraulic mechanics and working places safety normatives.

Every FT srl component system is delivered with relevant test certification and user manual that describe the all the necessities steps to follow in order to work with high performances and security conditions during use and maintenance.

Every FT srl component system has been realized according to standardized production and testing procedures.

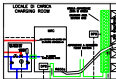
In this section there is a summary description of the functional characteristic of every FT srl component system. For a more detailed description please look at the relevant technical table.

Vacuum and Charging Machine (ROCKALL HC)

ROCKALL HC realizes the vacuum, a preliminary test leaks and Refrigerant (in liquid status) on the cooler circuits.

ROCKALL HC is designed to work inside a potential dangerous Area classified as zone 2, according to the CEI EN 60079-10 normative.

ROCKALL HC is realized with a unic cabinet internally separated by two separated volumes:



Electric Unit - it contains the all electrical components with electric valves connections with relevant power supply, sensors, transformers, safety relays to limit over possible current conditions and the main Electronic Control Unit.

The electric unit is also equipped with a door microswitch in order to cut the power supply to the unit when the door is opened.

Hydraulic Unit - it is contained under the Electric Unit and it is generally composed by:

- Refrigerant supply line
- Refrigerant pipes
- Refrigerant metering system (Volumetric or by RTP automatic dosator)
- Injector refrigerant line
- Pneumatic vacuum pump for Injector internal vacuum
- Sensor to detect refrigerant leaks
- Sensor to detect internal forced ventilation

All components of each line of refrigerant charge are sectioned by type of quick couplings Hansen or Faster, which simplify the replacement procedure of every component, making it easier and safer.

Each line also sectioned by two normally closed valves, one on the injector, the other on the refrigerant metering system which limit the amount of refrigerant lost, in case of leakage or malfunction of the sealing devices to the outside.



Medusa Jr Monitoring System

The monitoring system **Medusa Jr** represents the general central control and command of the entire plant for the treatment of refrigerant gas. It is essentially composed by electrical panel with electronic control unit and gas concentration detection sensors installed inside the charging working area, one of which directly installed inside the station Vacuum and Charging. The **Medusa Jr** system provides to control a forced ventilation system (see Eolo system) so to enhance the air flow rate in the presence of dangerous concentrations.



Medusa provides to give the Vacuum and Charging unit power supply electrical permission and the relevant Refrigerant Transfer pumps connected to the delivery line.

The electrical permission is real time determined according to the continuous monitoring of the refrigerant concentration detected from the sensors and a ventilation level detected from relevant differential pressure switches installed on the charging area ventilation circuit.

Medusa provides to alert operators and supplies additional ventilation, when the gas concentration reaches 15% of the Lower Flammability. The system will cut power to the vacuum system and charge, putting it in a stand-by safety. If the concentration exceeds 30% of the Lower Flammability. At this point is also given the warning sound on remote (optional) light columns to advise the operators to leave the working area and all fire prevention devices are run into execution. In case of lowering the level of concentration below the threshold value, the system must be reset manually by the operator.

Medusa is also supplied with:

- control box valves placed inside the storage box, each essentially equipped with a valve of the Barrier pneumatically operated with relevant pilot valve, manual valve, safety valve and accumulator
- safety valves for the refrigerant lines,
- valves control box placed in the supply room, each with sectioning valves, solenoid and manual, to stop, in case of need the power supply the power lines of the refrigerant
- box fire alarm, placed in proximity of the two doors of the storage box
- differential pressure switch for continuous efficiency check of the forced ventilation
- column indicating abnormal concentration of hazardous gas
- alarm indicators door or fan, in addition to the microswitch control opening of the doors of the storage box.



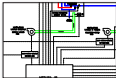
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Eolo the forced ventilation System

Eolo System consists essentially of a fan soundproof / free multispeed in Ex, rated capacity up to more than 4000 m³ / h, controlled by sensors, pressure differentials.

The control system is regulated by a special electrical panel, interfaced with the Medusa monitoring system and with the charging unit Rockall HC



The ventilation pumped by the Eolo system is routed in a pipe appropriately sized according to the factory layout. If the ventilation system ends to work (broken fan motor, accidental clogging ducts etc. ...) the Medusa system activates a procedure for disarming of the refrigerant pumping systems and the refrigerant charging machine as it no longer guaranteed safety.

The control of the operation takes place by means of differential pressure switches connected to the Medusa system that is dimensioned to detect the presence of air flow in the ventilation areas potentially more critical.

Operation Constraints of the Eolo System:

- The fan must be always in operation, the lower operating speed, when the machines are in operation, so as to maintain a continuous change of air in the working area
- the ventilation flow rate is set at the maximum speed, when one or more sensors detect a gas concentration greater than 15% of the Lower Flammability.
- The fan continues to run at full capacity even when, exceeded the threshold of 30% of the Lower Flammability, the power to the charging unit is cut and is given indication that you are in an emergency situation.

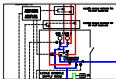


Refrigerant Transfer Pump (RTP)

The **Refrigerant Transfer Pumps** are volumetric pumps with cylindric movement designed to pressurize and transfer in liquid phase the refrigerant.

The **RTP** actoning is realized by means of compressed air.

Basically they are installed close to a tank or storage systems from which they aspire the refrigerant fluid thanks to the cylinders moved by compressed air and proper pneumatic valves. After that the fluid is compressed in liquid phase and transferred to the refrigerant charging machine.



The **RTP** are equipped on the refrigerant sending line with a barrier realized by means of unidirectional valves that avoid the fluid return towards the pump. As all the Refrigerant fluid tend to increase their specific volume with the temperature increasing, some events of uncontrolled pressure increase can appear due to the incompressibility of the fluid itself.

The **RTP** have a safety valve settled at 40 Bar that allows to discharge on the atmosphere eventual overpressure events on the sending outlet line.

Automatic Tank Changer System

This system is used to automatically replace the supply of refrigerant gas to the transfer pump when the tank runs out of stock. The principle of operation is based on monitoring of the movement of the piston of the pump RTP that in case of lack of refrigerant in the cylinder, tends continuously to make extraction cycles at a frequency much higher than that of normal use. The monitoring takes place by means of electrical signals from the appropriate limit sensors which close an electrical contact shown on the electronic control unit.



The **TCS** provides automatically to supply an alarm sound when the current tank is going to be empty and it must be replaced with a full tank. The alarm sound is also emitted with a red alarm light that (optionally) can be installed in a remote place.

As soon the **TCS** detects a empty tank status it provides to:

- close the pneumatic valve of the empty tank aspiration line and switch the suction line to the filled tank by opening the relevant pneumatic valve
- indicates the relevant procedures to restart the suction process from the filled tank.

Rockall HC

ROCKALL HC is an evacuation charging station for HCFC, HFC, HC and HFO refrigerants. It is an easy and effective to handle machine with a top charging accuracy.

ROCKALL HC is for medium and high throughput production lines of domestic and commercial refrigerators / freezers and other fields of application making use of isobutane (R600a) and/or propane (R290). Assembly lines making use of most recent refrigerants as R1234yf and R1234ze are also the natural workplace for **ROCKALL HC**

- Microprocessor or smart OS (optional) controlled
- Charging speed: up to 25 g/s for HC/HFO refrigerants and up to 40 g/s for HCFC/HFC refrigerants
- Charging capacity: up to 310 g for HC refrigerants (according to TÜV/Germany recommendations) or according to local limitations
- High charging accuracy
- Built-in vacuum pump (14,2 m³/h)
- Digital or volumetric refrigerant metering system
- Touch panel and LCD display
- Built in agreement to the European Machinery Directive, CE-marked, CE Safety standards for potential dangerous areas
- 200 programmable cycles



Main using applications

- Domestic refrigerators and deep freezers
- Professional Refrigeration
- Refrigerated show cases and cooling cabinets
- Automatic food and beverage dispenser machines
- Ice-cream machines
- Dehumidifiers
- Domestic air conditioners

The equipments for vacuum and HC-R600a and R290 charge are designed and assembled for the construction of areas of assembly of refrigeration units to be charged with flammable gases according to the indications of the ATEX Directive 99/92 / EC. As the working areas are classified as hazardous, these equipments must be installed within an enclosure and ventilated able to withstand any refrigerant leaks. The electric and hydraulic components of the vacuum and charging station have been chosen by FT to comply with ATEX for the classification of areas at high risk of explosion and thus make the whole system suitable for working with flammable liquids.



Technical Characteristics

	ROCKALL HC UNO	ROCKALL HC DUE
Injectors/Type	1/FULLFILLER+	2/FULLFILLER+
Injectors Length	3,3 m, different on demand	
Refrigerant metering system	1	2
Charging capacity	310 g for HC* / 10 kg for HFC	
Charging speed	up to 25 g/s (HC refrigerants) up to 40 g/s (HFC refrigerants)	
Charging accuracy	±0,5 g (<100 g HC), ±0,5 % (>100 g HC) ±1,0 g (<200 g HFC), ±0,5 % (>200 g HFC)	
Injector connection	1/2" Hansen F (ISO 7241B)	
Connection to the refrigerant supply line	1/2" Hansen M (ISO 7241B)	
Vacuum pump capacity	14,2 m ³ /h	
Number of programmable working cycles	200	
Control Unit	EC709	
Working temperature	5 + 45 °C	
Compressed air supply	6 + 7 bar not lubricated	
Requested Refrigerant supply	Pressurized, in liquid phase	
Power Supply	400 V – 50 Hz – 3ph+N+earth	
Power consumption	0,6 kW, with 14,2 m ³ /h vacuum pump	
Dimensions (h x w x l)	1500 x 600 x 850 mm	
Weight	150 kg	

Optional features and devices

Light and Acoustic Alarm
Injectors FULLFILLER+ 3/8"
DCA (Data Collector Application for RS232/USB)
20,5 m ³ /h Vacuum pump
Automatic working cycle selection performed by bar code reader



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Medusa

Medusa is the ambient monitoring system that allows to keep constantly in the safety the vacuum and charging machine within the working area storage area and the refrigerant pressurization area.

Medusa can be configured according to the customer specific installation:

- Built in agreement to the European Machinery Directive, CE marked, CE Safety standards for potential dangerous areas
- Basic version suggested with three ambient sensors
- Microprocessor controller
- User interface with alarm lights, display and TOUCH keyboard
- Provided with integrated Acoustic Alarm
- Provided with UPS (Uninterruptible Power Supply)



Medusa supply and control the EOLO fan rate ventilation by means of a proper Power Electric cabinet. The Power rate can be configured according to the customer layout.

Medusa standard version is provided with catalytic sensors that include (optionally) a sensitivity calibration device to check their performances according to the European Machine Directive.

Necessary devices for Medusa

- Fire alarm box
- Gas alarm indicators column (up to three)
- Fan/door alarm indicators column (up to three)
- Spring + microswitch for charging room door
- Pneumatic, hand and safety valves group + 0,7 l accumulator
- Pneumatic, hand and safety valves group + refrigerant filter
- 30/40 bar safety valve
- EOLO multi speed fan up to 4000 m³/h (400 V-50 Hz-3ph+N+earth)

Main using applications

Medusa advise operators and initiate additional ventilation, when the concentration of Isobutane/Propane reaches 15% of the Lower Flammability. The system provides to cut the power supply to the vacuum and charging unit, putting it in a safety position, where the concentration exceeds 30% of the Lower Flammability. At this point is also given the Alarm because the operators to leave the working area and activate all systems of fire prevention.

Technical Characteristics

Environment sensors	From 3 to 5
Type of environment sensors	Catalytic
EOLO fans monitored	2 or 4
Differential pressure switches	1 or 2
Available Outputs to	<ul style="list-style-type: none"> cut the supply to the charger, to tank charger system, to the vacuum pump in the repair area, to the refrigerant delivery line from the transfer pump audible and light alarms opening delivery valve for "anti-fire agent"
Available Inputs to	<ul style="list-style-type: none"> state (ON/OFF) of charger state (Open/Closed) of working area door state (Activated/Not activated) of fire alarm push button
Control Unit	EC709
Working temperature	5 + 45 °C
Power supply	400 V – 50 Hz – 3ph + N + earth
Rated electric current	~ 7 A controlling 2 ventilation units ~ 14 A controlling 4 ventilation units
Dimensions	800 x 600 x 250 mm
Weight	45 kg

Optional features and devices

Calibration kit for HC sensors
IR environment sensors



Medusa and Eolo control Panel



Eolo Fan Unit

Ecologic No-Flammable Refrigerants

Introduction to the Ecologic No-Flammable refrigerants use

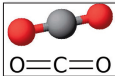
The market for refrigeration and air conditioning is focusing more and more on issues related to the environmental impact of their systems in order to comply with established of the Montreal Protocol (1987) and the Kyoto Protocol (1997).

During the last ten years the use of Carbon Dioxide (CO₂) as a refrigerant has gained renewed interest because of ecological problems caused by the use of synthetic fluids (CFC-HCFC-HFC).



As matter of fact, Carbon Dioxide

- is a natural refrigerant
- has ODP = 0 (Ozone Depletion Potential)
- has GWP = 1 (Global Warming Potential)
- is not a flammable refrigerant
- is not toxic
- is a product available in all the world
- is a low cost product



Furthermore, European governments are planning the progressive restriction of the use of synthetic refrigerants in any type of heating system: for example, the Norwegian government provides for the payment of fees for the use of HFC refrigerants while the Austrian has prohibited the use from 2008; in the same direction are moving the Switzerland and Denmark governments.

It is still a fact that the governments of the North-European Nations are strongly promoting the use of natural refrigerants, collaborating with organizations like NGO (Non Governmental Organizations) as Greenpeace and UNEP.

As of today the challenge that leads to the use of air conditioning and refrigeration without HFC and HCFC was already full collected by famous multinationals that are making several thousand Field Test worldwide.

FT srl works every day to encourage and provide industrial solutions that relate to the processing of refrigerant gases in total respect of the environment and according to international protocols that have been adopted over the years.

Rockall CO₂

Rockall CO₂ is the most recent FT sif solution for vacuum and Carbon Dioxide chrefrigerant charging.

Rockall CO₂ is dedicated to the most recent production lines for commercial and domestic refrigerators/freezers, conditioners, heating pumps, liquid cooler where the production is realized with vapour Carbon Dioxide.

- Compact and light weight design
- Charging capacity: up to 10 kg
- Charging speed: up to 10 g/s with CO₂ in vapour phase
- Charging accuracy: 1% of settled dose
- Refrigerant Metering system realized by massic flowmeter
- Built-in vacuum pump (17,0 m³/h @ 50Hz, different on request)
- TOUCH keyboards with LCD display
- Up to 200 programmable work cycles
- Microprocessor controlled User Interface
- Designed and assembled according to the European Machinery Directive, Safety standards CE marked



Main using applications

- Domestic refrigerators and deep freezers
- Professional Refrigeration
- Refrigerated show cases and cooling cabinet
- Domestic air conditioners
- Heat pumps
- IT coolers
- compressed air driers
- Condensing units

Technical Characteristic

	ROCKALL CO ₂
Injectors/Type	1/FULLFILLER+
Injector lenght	3,3 m, different on demand
Refrigerants	CO ₂
Refrigerant Metering system	1
Charging capacity	up to 10 kg
Charging speed	up to 10 g/s*
Charging accuracy	< 300 g: ±1 g > 300 g: ±1 %
Injector connection	1/4" Hansen F (ISO 7241B)
Refrigerant delivery line connection	1/4" Hansen M (ISO 7241B)
Vacuum pump rate	17 m ³ /h
Programmable cycle number	200
Control Unit	EC709
Working Temperature	5 + 45 °C
Refrigerant delivery	pressurized in vapour phase
Power supply	400 V – 50 Hz – 3ph+N+earth
Power consumption	0,7 kW with 17,0 m ³ /h vacuum pump
Dimensions (h x w x l)	1500 x 600 x 850 mm
Weight	140 kg

*CO₂ charged in vapour phase

Optional features and devices

Light and Acoustic Alarm
PHV20 Vacuum Pump with Oil Mist filter TMF36
DCA (Data Collector Application for RS232/USB)
FULLFILLER+ Injector lenght on demand
Automatic working cycle selection performed by bar code reader
Only vacuum head Injector 1/4" Hansen

iRockall

New Smart Digital Units generation

iRockall is designed to fulfill the highest standards of the processing requirements of the processes of vacuum and refrigerant charge.

iRockall is equipped with an electronic control of the latest generation, high computing capacity and memory, and is able to be managed by a smart operating system and easily interactive with the user.

The intelligent electronic control of **iRockall** allows interactivity with the same philosophy and simplicity to operate a modern Tablet / PC with a touchscreen display.

FT has maintained from the point of view electromechanical the same characteristics of strength, reliability and accuracy of the models of Rockall penultimate generation.



iRockall communicates with the company and is an integral part of the production process. It has its own standard LAN communications interfaces and software suitable to be connected to company networks for control and export directly to the office the reports of work performed. All executed in complete safety.

Thanks to its intelligent connectivity, **iRockall** is already prepared for tele-assistance from the mother company, **FT srl**, enabling significant cost and time savings in critical situations of post-sale.

iRockall is available for applications charge of HFC, HC and CO2 over the whole range of products displayed on our catalog.



FT

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Technical Characteristic

	IROCKALL UNO	IROCKALL DUE
Injector/Type	1/FULLFILLER+	2/FULLFILLER+
Injectors lenght	3,3 m, different on demand	
Refrigerant Metering System	1	2
Charging capacity	310 g for HC* / 10 kg for HFC	
Charging speed	up to 25 g/s (HC Refrigerants) fino a 40 g/s (HFC refrigerants)	
Charging speed	±0,5 g (<100 g HC), ±0,5 % (>100 g HC) ±1,0 g (<200 g HFC), ±0,5 % (>200 g HFC)	
Injector connection	1/4" Hansen F (ISO 7241B)	
Refrigerant delivery line connection	1/4" Hansen M (ISO 7241B)	
Vacuum pump rate	14,2 m ³ /h	
Programmable working cycle	1000	
Control Unit	TS609 Linux Embedded	
Working Temperature	5 + 45 °C	
Compressed air supply	6 + 7 bar not lubricated	
Refrigerant supply	pressurized in liquid phase	
Power supply	400 V – 50 Hz – 3ph+N+earth	
Power consumption	Circa 0,6 kW, con pompa vuoto 14,2 m ³	
Dimensions (h x w x l)	1500 x 600 x 850 mm	
Weight	160 kg	

technical features are possible

Optional features and devices

Light and Acoustic Alarm
E2M18 Vacuum Pump with Oil Mist filter EMF20
DCA (Data Collector Application for LAN Ethernet)
FULLFILLER+ Injector lenght on demand
Automatic working cycle selection performed by bar code reader
Only vacuum head Injector 1/4" Hansen

Vacuum and Charging Injectors

Main Characteristics

The injector is the connection device between the Refrigerant charging machine and the cooler refrigerant circuit.

Its characteristics are very important and variable according to the refrigerant charging unit characteristics that depend on the production assembly line.

The main FT injectors parameters are:

- light and easy on the use
- high affidability and low maintenance frequency
- low cost electric version or high performances pneumatic version are available
- high speed switch of internal micro-valves for high repeatability and accuracy
- safety during use
- further services to increase performances on HC refrigerant use applications

General Injectors Overview

High performances HC, HCFC, HFC Applications

FULLFILLER +



Also CO₂ Application available

MFIL



HCFC, HFC Application

VORTFILLER



ISSO



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FULLFILLER+

for 1/4" or 3/8" quick connectors



FULLFILLER+ is a vacuum and charging injector with pneumatic/electromagnetic control, which minimizes any dead spaces to ensure the maximum compactness and the entire transfer towards the group circuit in the cooling fluid computed from the charging station.

FULLFILLER+ is an injector without any refrigerant release on the environment, designed for medium/high throughput production lines.

The pneumatic needle valve and automatic connection to the unit to be processed are 1/4" or 3/8" Hansen (ISO 7241B). They are also available in alternative connections 1/4" or 3/8" SAE Automotive. The standard length of the injector is 3.3 m.

FULLFILLER+ is standard supplied **DEMPO**, **ROCKALL HC**, **ETNA** and **ROCKALL COs**.



ISSO

for 1/4" or 3/8" quick and threaded couplings

ISSO is a fully pneumatic controlled injector.

The vacuum valve, the refrigerant valve and the needle are pneumatic operated. This is to control the position of the Schrader valve or the Hansen internal ogive during the coupling of the injector and to prevent any entrance of air inside the unit work, in which has already been realized preliminary vacuum.



Available in the following versions:

- 1/4" or 3/8" Hansen quick coupler (ISO 7241B)
- automotive connection (suction or send side)
- 1/2" SAE quick coupler with Schrader valve

standard length: 3.3 m

ISSO is standard equipped on **ROCKALL HS** e **DEMPO AC**.



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VORTFILLER and VORTFILLER+

for 1/4" quick connectors

The **VORTFILLER** series injectors are electromagnetic piloted, this to control the vacuum and refrigerant cartridge on the valve.

They are equipped with 1/4" Hansen quick connector or -as optional- with 1/4" SAE Schrader.

VORTFILLER+ is equipped with a ergonomic trigger on the hansen coupler and START button.



VORTFILLER is standard supplied in **TEIDE TTD** and **ROCKALL Jr.**

VORTFILLER+ is standard supplied in **ROCKALL.**

The standard length of the injector is 2,5 m.

Refrigerant Transfer Pumps

RTP - Devices to pressurize and transfer refrigerant to delivery lines

The pumps designed specifically for the transfer and pressurization of refrigerants are provided with a complete equipment in adjunct, which includes:

- Pressure regulator fluid in the supply line
- Gauge pressure of the fluid in the supply line
- Safety valve by-pass to protect the RTP from possible over-pressure in the discharge line
- Unit filter / dryer for compressed air

Complementari Tools

- Filter on inlet with high capacity, to protect the pump from solid impurities that may be present the treated refrigerant
- Quick couplings with flat faces for couplings having the suction and discharge, to enable rapid connections and disconnections from the refrigerant lines, in case of pump maintenance operations
- Suction hose to connect the filter to the storage tank and to the pump
- Hose in the supply to connect directly the pump to the refrigerant charging unit
- Safety valve for emission of refrigerant to the outside or inside the tank in case of emergency
- Hydropneumatic accumulator to maintain stable discharge pressure the case of unexpected refrigerant flow variation in the distribution system
- Lubricator compressed air (only necessary in the case of use of lubricated compressed air)

RTP 6310 RTP 6315



RTP 6325T



Technical Characteristics

	RTP6310	RTP6315 RTP6315-HC	RTP6325T RTP6325T-HC
Maximum rate	3,6 l/min	6,0 l/min	13,0 l/min
Dimensions	340x200x340 mm	540x200x350 mm	1100x200x400 mm
Weight	15 kg	17 kg	40 kg
Refrigerant compatibility	HFC*	RTP6315, RTP6325T: HFC, HCFC RTP6315-HC, RTP6325T-HC: HC, HFC, HCFC	
Number of Hydraulic cylinders	1, doppia azione di compressione	1, doppia azione di compressione	2, doppia azione di compressione
Geometrical multiplier ratio**	4,27		
Integrated safety valve setting	4000 kPa		
Delivery line connection	1/2" GAS-M		
Suction line connection	3/4" GAS-M		
Compressed Air supply	Dried, filtered, not lubricated		
Compressed air Pressure	2 + 6 bar		
Compressed air Pressure pipe typology	RILSAN Ø= 8 mm		

* Equal to the ratio:refrigerant delivery pressure-refrigerant supply pressure/ compressed air pressure
features subject to change without notice; please contact FT Sales Service for more informations

Optional features and devices

RTP Connection KIT
Automatic RTP Stopping System (RTP SS) (with acoustic alarm, red-green light, HFC or
Automatic Tank Change system (TCS)
Customization on special platform composed by RTP SS + TCS + Hydro pneumatic accumulator

Automatic RTP stopping system



Automatic Tank Change system



Hydropneumatic Accumulators

The hydropneumatic accumulator is a device designed specifically for the storage of liquids under pressure. As liquids are, for all practical purposes, incompressible, the objective is achieved by utilising the compressibility of gases.

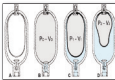
A- A flexible separator bladder is fitted into a pressure vessel (accumulator shell).

B- Through a special valve an inert gas (nitrogen) is introduced into the bladder with pressure P_0 . The bladder expands, filling the entire volume V_0 of the accumulator shell.

C- When circuit pressure P_1 is higher than the gas precharge pressure P_0 , the liquid valve opens, and the bladder is compressed reducing the gas volume to V_1 .

D- When the liquid pressure rises to P_2 , the volume of gas reduces to V_2 with an attendant rise in pressure, thus balancing the liquid pressure.

This means that the accumulator has been pressurised $\Delta V = V_1 - V_2$ and a potential energy has been created to be utilised as desired.



The accumulators can be conveniently used in different applications, of which the main ones are:

- Reserve liquid under pressure, to temporarily maintain high levels of flow rate.
- Stabilizer of pressurized lines, to limit the fluctuations for thermal changes or the flow rate.
- Energy reserve in the form of pressurized fluid or hydraulic spring.
- Absorber hammering or pulsation of the fluid.

The accumulators are available for many standards Industrial Refrigerants and fluids as:

- refrigerants HFC (R134a, R404A, R407C, R410A, R507, others)
- refrigerants HCFC (R22),
- refrigerants CFC (R12, R502),
- refrigerants HC (R600a, R290)
- other "natural gases" as NH3 (R717) e CO2 (R744), industrial oils or general fluids
- CE-PED, ATEX and ML available on request

FT srl provides accumulators with preloaded pressurized nitrogen as standards. When choosing an accumulator please contact the technical department of FT srl to communicate the nature of the fluid used.



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Accessories suggested with Accumulators

- Support brackets
- Holding collars
- Kit pipe / fittings for interfacing with systems RTP
- Verification system Preload nitrogen

Contact the technical FT srl for proper sizing accumulators, size and accessory piping

Capacity and Typology Accumulators

FT order code	Description of the accumulator
X00168	0,7LT NEOPRENE BLADDER 360BAR
X01458	0,7LT PERBUNAN BLADDER 360BAR
X01236	1,5LT SACCA NEOPRENE BLADDER 360BAR
X01844	1,5LT SACCA NEOPRENE BLADDER 80 BAR
X01257	1,5LT SACCA PERBUNAN BLADDER 360BAR
X01845	1,5LT PERBUNAN BLADDER 80 BAR
X01166	3 LT NEOPRENE BLADDER 360 BAR
X01750	3 LT PERBUNAN BLADDER 360BAR
X01759	3 LT PERBUNAN BLADDER 80 BAR
X01846	3LT NEOPRENE BLADDER 80 BAR
X00923	5 LT NEOPRENE BLADDER 360BAR
X01470	5 LT PERBUNAN BLADDER 360BAR
X01848	5LT PERBUNAN BLADDER 80 BAR
X00573	10 LT NEOPRENE BLADDER 360BAR
X01749	10 LT NEOPRENE BLADDER 50 BAR
X01299	10 LT PERBUNAN BLADDER 360BAR
X01748	10 LT PERBUNAN BLADDER 50 BAR
X00768	15 LT NEOPRENE BLADDER 360BAR
X01747	15 LT NEOPRENE BLADDER 50 BAR
X01300	15 LT PERBUNAN BLADDER 360BAR
X01746	15 LT PERBUNAN BLADDER 50 BAR
X01745	20 LT NEOPRENE BLADDER 50 BAR
X01698	20 LT PERBUNAN BLADDER 360BAR
X01744	20 LT PERBUNAN BLADDER 50 BAR
X01849	20LT NEOPRENE BLADDER 360BAR
X01269	25 LT NEOPRENE BLADDER 360BAR
X01743	25 LT NEOPRENE BLADDER 50 BAR
X01704	25 LT PERBUNAN BLADDER 360BAR
X01742	25 LT PERBUNAN BLADDER 50 BAR



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Professional Leak Detectors

portable version - for refrigerant gas and tracers mixtures

MTD 92

leak detector compact size, portable, high versatility.

Equipment supplied with battery supply system and relevant charger, double plug-in cable, sensor unit integrated suction, provided with suction tip, shock-proof case.



Available probes	- refrigerant HFC and HC - tracer mixture gases N ₂ /H ₂ (5% H ₂)
Sensitivity probes for HFC and HC	from 0,3 to 30 g/year HFC, on three scales: 0,3 + 3 g/year HFC, alarm @ 1 g/year 1 + 10 g/year HFC, alarm @ 3 g/year 3 + 30 g/year HFC, alarm @ 10 g/year from 0,1 to 10 g/year HC, on three scales: 0,1 + 1 g/year HC, alarm @ 0,3 g/year 0,3 + 3 g/year HC, alarm @ 1 g/year 1 + 10 g/year HC, alarm @ 10 g/year
Sensitivity probes for tracer mixtures N ₂ /H ₂	from 2x10 ⁻⁶ to 2x10 ⁻⁴ cm ³ /s H ₂ , on three scales: 2x10 ⁻⁶ + 2x10 ⁻⁴ cm ³ /s H ₂ , alarm @ 6x10 ⁻⁶ cm ³ /s 8x10 ⁻⁶ + 8x10 ⁻⁵ cm ³ /s H ₂ , alarm @ 2x10 ⁻⁵ cm ³ /s 2x10 ⁻⁵ + 2x10 ⁻⁴ cm ³ /s H ₂ , alarm @ 6x10 ⁻⁵ cm ³ /s
Operating Principle	Sniffer with evaluation of thermo conductive sampled gas
Heating time / reaction time	~ 1 minute / 1 s
Reading display	Array of 6 LED alarm light and sound, self-diagnosis by means of LEDs indicating temporary malfunction or permanent as saturation, degassing, etc.
Cable lenght	1,5 m
Autonomy	4 hours (8 hours special version at request)
Recharging time	8 hours (230 Vac battery charger)
Dimensionis / Weight	220x65x30 mm / 0,45 kg
Standard content of the supply	Charger, sensor with integrated suction unit, suction tip, shockproof case

Possible changes without notice



TM

Future Technologies

Professional Leak Detectors

industrial version - for refrigerant gas and tracers mixtures

MTD 95

leak detector compact size, portable, high versatility.

Power supply with cable. Equipment provided with dual double plug-in cable, sensor unit with integrated suction, provided with suction tip



Available probes	- refrigerant HFC and HC - tracer mixture gases N ₂ /H ₂ (5% H ₂)
Sensitivity probes for HFC and HC	from 0,3 to 300 g/year HFC, on ten scales: MAX: 0,3 + 3 g/year HFC, alarm @ 1 g/year MIN: 30 + 300 g/year HFC, alarm @ 100 g/year Setting Alarm @: 1/2/3/5/7/10/20/30/50/100 g/year of HFC from 0,03 to 30 g/year HC, on ten scales: MAX: 0,03 + 0,3 g/year HC, alarm @ 0,1 g/year MIN: 3 + 30 g/year HC, alarm @ 10 g/year Setting Alarm @: 0,1/0,2/0,3/0,5/0,7/1/2/3/5/10 g/year of HC
Sensitivity probes for tracer mixtures N ₂ /H ₂	from 1x10 ⁻³ to 1x10 ⁻⁴ cm ³ /s H ₂ , ten scales: MAX sensitivity: 1x10 ⁻⁴ + 1x10 ⁻³ g/year H ₂ , alarm @ 3x10 ⁻³ g/year MIN sensitivity: 1x10 ⁻⁵ + 1x10 ⁻⁴ g/year H ₂ , alarm @ 3x10 ⁻⁵ g/year
Operating Principle	Sniffer with evaluation of thermo conductive sampled gas
Heating time / reaction time	~ 2 minutes / 1 s
Reading display	Array of 13 LED with luminous acoustic alarm signal (adjustable volume), self-diagnosis by means of LEDs indicating temporary malfunction or permanent as saturation, degassing, etc.
Cable lenght	1,5 m
Power supply / consumption	230/110 V, 50/60 Hz, 25 W
Dimensions / Weight	300x200x150 mm / 5 kg
Standard content of the supply	power supply cable, sensor with integrated suction unit, suction tip

Possible changes without notice



TM

Future Technologies

Professional Leak Detectors

Infrared version - for Refrigerant Gas

HLD 5000

Leak detection in a compact, portable, high versatility and speed of use.

Versions for R134a, R404A, R407C, R410A, R22, CO₂, other gases. Equipped for power supply



Sensitivity	1 + 50 g/year
Probe lenght	4,8 m
Reaction time	< 1 s
Signaling	Digital
Zero	Automatic, with self-compensation of environmental contamination
Power Supply	220/240 V - 50/60 Hz
Calibration	Feasible within seconds by referring to internal calibrated leak
Gas	Version available for R134a, R404A, R407C, R410A, R22, CO ₂ and other gases
Auto Test	available, aspirated gas flow 320 acm
Working temperature	10 + 50 °C
Dimensions (high x diameter)	365 x 260 mm
Weight	4,5 kg

Possible changes without notice

Professional Leak Detector

mass spectrometer - for refrigerant gases and tracer mixtures

Ecotec E3000

The Ecotec E3000 is a professional bench Leak detector with High functionality and versatility.

Power supply with cable. Equipment provided with dual plug-in cable , sensor unit with integrated suction, suction tip



Maximum sensibility	0,05 g/year 1×10^{-6} mbar l/s for He
Probe lenght	3 m, more on request
Reaction time	< 0,8 s
Number of detectable gases at the same time	up to 4
Number of gas in the database	Over 100
Signaling	Digital by means of bar graph
Zero	Automatic, with self-compensation of environmental contamination
Power supply	220/240 V - 50/60 Hz
Calibration	Feasible within seconds by referring to internal certified calibrated leak ECO. The operation can be done by external instruments
Gas	Gas CFC, HCFC, HFC, HC, He, etc.
Auto Test	available, aspirated gas flow 160 sccm
Working temperature	$10 \pm 45^{\circ}\text{C}$
Dimensions / Weight	610 x 370 x 265 mm / 34 kg

Possible changes without notice

Professional Leak Detectors

quartz window technology - for He tracer gas

Protec P3000

The Protec P3000 is a professional bench Leak detector with High versatility.

Power supply with cable. Equipment provided with dual plug-in cable , sensor unit with integrated suction, suction tip



	PROTEC P3000	PROTEC P3000XL
Maximum sensitivity / Range measure	1×10^{-7} mbar l/s / 5 decades	1×10^{-7} mbar l/s / 5 decades
Probe Length	3 m, higher on request	
Reaction time	< 700 ms	< 450 ms
Signaling	Digital by means of bar graph	
Zero	Automatic, with self-compensation of environmental pollution	
Power Supply	220/240 V 50/60 Hz	
Calibration	Feasible within a few seconds referring to the calibrated leak certified PRO-Check integrated into the instrument	
Tracer Gas	Helium	
Auto Test	Available, gas flow aspirated 300 sccm	Available, gas flow aspirated 3000 sccm
Working Temperature	10 + 45 °C	
Dimensions / Weight	610 x 370 x 265 mm / 27 kg	

Possible changes without notice

Amiata

Vacuum, tracer gas (H₂ or He) mixtures Pressurization unit

AMIATA is a portable station to handle charge and discharge of pressure test gases and tracing mixtures.

AMIATA, has been designed in particular for making pressure tests and leak test of refrigerating units with the use of inert gas or tracer gases such as helium or nitrogen/hydrogen, according to the ISO 10156 Standard; before the charge of the test gas it is possible to perform a vacuum cycle so to get a first cleaning of the unit and to make a preliminary tightness test.



AMIATA is ideal for the tracing of components and refrigerating units, on production lines for any kind of appliance, wherever a pressure test or/and a trace gas leak test is required.

Functional Characteristics

- High versatility and portability thanks to compact design
- Maximum test pressure 20 bar, 40 bar on AMIATA 2
- Digital gauges for pressure and vacuum measurement
- Integrated pneumatic vacuum pump (5,2 m³/h capacity)
- AMIATA is ready to be connected to external larger vacuum pump
- Setting of working cycle parameters, filling/monitoring and printing test reports by connection to external PC
- Bar code reader -as optional
- Microprocessor controlled
- 50 programmable working cycles (200 on AMIATA 2)
- Reporting of the subcycle in progress
- Possibility to pressurize two different gas mixtures on AMIATA 2
- Built in agreement to the European Machinery Directive, Safety standards CE marked

Technical Characteristics

	AMIATA	AMIATA DUE
Tracer gas/mixtures	1	2
Injectors	1	1
Pressurizzazione System	1 realized with Aluminium block	
injector Lenght	2,5 m, other at request	
Maximum Test pressure	20 bar	40 bar
Pressure Sensor resolution	1 kPa	
Connection to the unit to be tested	1/4" Hansen F (ISO 7241B). 1/4" SAE at request	
Vacuum pump capacity	Integrated pneumatic depressor 5,2 m ³ /h; DN16KF flange for connection to ext. vacuum pump	
Programmable cycles	50	200
Safety valve security setting	> 40 bar; configurable at request	
Control Unit	microprocessor	
PC connection	RS232	
Power supply	230 V – 50 Hz – 1ph + earth	
Power consumption	0,2 kW	
Compressed air supply	6÷7 bar	
Dimensions	560x420x300 mm	
Weight	~15 kg	
Working temperature	from 5 °C to 45° C	

The provided unit could not exactly match with the one described

Optional features and devices

DCA (Data Collector Application for RS232/USB)
External depressor
Automatic working cycle selection performed by bar code reader
On-Board printer
Obstructed vacuum group test and/or capillary test (only in AMIATA 2)
Integrated vacuum pump > 8m ³ /h / unit assembled on a hydraulic cabinet realized byFT



Systems for preliminary evacuation

for pre evacuation circuits carousels

GV-XX

The GV units are designed for pre-evacuation of refrigeration units. They are provided with pipe fittings and ready for use.

The power supply is recommended using three-phase systems to facilitate the initial stages of the pump in the winter period



In the suction line of the pump:

- Filter to protect the vacuum pump from liquids, such as compressor oil or moisture
- Digital Pirani vacuum gauge with adjustable set point. Alternatively Vacuum State Indicator, with Gems for indicating the degree of vacuum detected: Green (vacuum threshold reached) and Red (vacuum threshold not reached)
- Two lines of high conductance vacuum with quick Hansen F to connect the units to be evacuated

The the exhaust line of the pump can be equipped with high efficiency filter (efficiency up to 99.999% DOP test); the filter allows the recovery of the oil retained, in order to drastically reduce the consumption of oil of the vacuum pump.

RV series vacuum pumps

RV vacuum pumps are top quality and last generation pumps very easy to be put in use, very quiet during operation and really intuitive in the maintenance.

All controls are clearly marked and have large finger grips for ease of use. The sight glass is clearly visible and both inlet and outlet are fitted with standard NW 25 flanges for the easiest connection to accessories.

Large diameter oil passages allow easy maintenance and any filling spillage is contained by the oil box well. No special tools are needed for servicing. The high reliability and top performance of this innovative line of pumps are well experienced in the refrigeration and A/C applications



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Systems for preliminary evacuation

for pre evacuation circuits carousels

E2M series vacuum pumps

E2M series is the international reference point both for performance and long term reliability for vacuum pumps in the industrial installations. E2M pumps can be equipped, according to the application needs, with a very large set of accessories and are available in broad range of capacities: 18, 28, 40, 80, 175 and 275 @ 50 Hz.

In the cases where very high pumping speeds are required, E2M pumps can suitably be coupled to Roots mechanical booster pumps. Other pump models available on request.



EPS XX Expert Pumping System

Compact system for pre-evacuation has four flexible lines vacuum, **EPS** is capable of processing from one to four groups simultaneously.

It is designed for high-capacity production.

- working cycles including functions emptying until vacuum level assigned to be achieved within the settled time and evidence of rising pressure.
- digital indication the level of vacuum reached through active head Piani.
- processing method configurable: LOW, SERIAL, ROTATION, PARALLEL.
- connectable to the sides of the high and low pressure of two independent groups, or to the different sections of the larger groups. Overall dimensions 1150x600x400 mm.
- Pumps are available with different flow rates: 16, 20, 30, 40, 80 m³ / h
- setting up to 100 different cycles can be preset; more on request.
- Power: 400 V - 50 Hz - 3ph + N + earth



Available accessories (on request)

- Printer
- Inlet catchpot with centering ring and clamping collar
- Phase sequence relay



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Refrigerant Recovery Units

RG-690 and RG-692 recovery unit

Professional extraction units easy to transport thanks to their compact design, making them ideal for mobile service on refrigeration and air-conditioning systems. Suitable for all standard refrigerants (CFC-HFC-HCFC). Not suitable for HC or NH₃.

The extraction units are equipped with a powerful oil-free compressor (0,37 kW). The innovative design combined with a cooling fan provides optimum cooling. The units are switched off automatically as soon as the extraction process has been completed. RG-692, in addition to the features of RG-690, has the capability to separate humidity, oil and soiling from the recovered refrigerant. A sight glass with humidity indicator advises when the filter dryer has to be replaced.

Extraction rate: liquid up to 84 kg/h; connections 1/4" SAE; safety pressure limiter at 38 bar; units for pressure values bar and psi; power supply 220/240 V-50/60 Hz; dimensions (L x W x H) in mm: 432 x 254 x 305; weight: 16 kg.

RG-690



RG-692



UCRTO recovery unit

Provided with dual 0,55 kW oil-less compressors, UCRTO can be easily switched for the recovery of amounts of standard refrigerants (CFC-HFC-HCFC) and other high-pressure refrigerants and blends. An automatic low pressure shut off at 500 mbar is available, and the float cable connection has a built in bypass switch for convenience.

Extraction rate:

- up to 16 kg/h refrigerant in vapor phase
- up to 16 kg/h refrigerant in liquid phase
- up to 675 kg/h Push-Pull, mode

A valve is used to extract the vapor, the other to deposit the recovered liquid in the cylinder.

Power supply/consumption 220 V / 0,35 kW.

Dimensions (lungh. x largh. x alt.): 457x254x406 mm.

Weight: 29 kg.

The unit is supplied with filter, pressure indicators for the suction and discharge lines, fuses placed to 28 or 38 bar.



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Electrical safety test

Semiautomatic electrical safety tester

MP500 MP510

Portable semiautomatic systems—consisting of one (MP500) or two (MP510) control boxes—designed to test single-phase powered appliances, rated with power up to 3 kVA (MP500) or up to 4,5 kVA (MP510).

The system is controlled by microprocessor and provided with LCD display allowing the configuration of different test programs for the different appliance to be tested. It can locally store up to 200 test programs and 100 test results. It is ready to be fitted to barcode reader.

Serial interface for remote PC connection to manage, program and file data of performed tests.

Performed Tests

- Ground conductor efficiency
- Insulation resistance
- Dielectric strength (applied voltage)
- Residual current
- Electrical absorption, 50 or 60 Hz
- Leakage current (only with MP510)

Available options

- Ground test probe
- Calibration box
- Bar code reader
- On-board printer
- Software for collecting data in external PC

MP500



MP510



Electrical safety test

Automatic electrical safety tester

ESC is an automatic test system housed in a metallic cabinet (with or without castors) designed to test single-phase or three-phase appliances having rated power up to 10kVA, with the possibility to supply the appliance with stabilized tension.

The system is provided with microprocessor controller and LCD display which allows the configuration of different testing programs for different appliance to be tested.

The system can locally store up to 200 test programs and 100 test results. It is ready to be fitted to barcode reader.

Serial interface for remote PC connection to manage, program and file data of performed tests.



Performed Tests

- Ground conductor efficiency
- Insulation resistance
- Dielectric strength (applied voltage)
- Residual current
- Electrical absorption, 50 or 60 Hz
- Short-circuit

Available options

- Ground test probe
- Calibration box
- Bar code reader
- On-board printer
- Software for collecting data in external PC



Functional safety tests

System for appliance performance tests

CAR1000

CAR1000 system is designed to run performance functional tests on electrical equipment, in particular refrigerators and AC units of all kinds. It consists of a central control unit and a number of acquisition boxes placed nearby the products under test.

Each acquisition box monitors up to 3 temperatures as standard (or up to 5 as option) and the current of the unit under test (power load as an option).



The control unit reads the data collected by the acquisition boxes, stores the test data on a database, identifies the product model by identification code, and then compares the test data with the reference parameters for such model, in order to decide whether the unit has successfully passed the test or not.

The Pass/Reject result is displayed on the screen and stored on the database. All data can be traced in order to comply with the ISO 9000 standard framework.

CAR1000 is available on the following versions:

- **Moving Carousel**, suitable for mass production lines of domestic appliances
- **Batch Test**

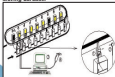
In the **Batch Test** version the products are tested in batches. The acquisition boxes are mounted in a fixed position, usually on a wall, and the items to test are placed next to them.

Once the test cycle is completed the products are removed and a new batch is connected to the test system. The acquisition boxes send the data to the control station via RS422 serial link. This version is more suitable for small and medium production lines.

Batch test



Moving Carousel



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Technical Characteristics of the CAR 1000

Personal computer and test management software
Keyboard or barcode reader for data input
Printer for reports
PC/box interface with relevant acquisition board
PT100 probe for temperature detecting
C-loop Data acquisition
Dimensions: L = 550 mm, W = 600 mm, H = 1800 mm on cabinet

Technical Characteristics of the Acquisition Box

Acquisition Box Dimension: L = 400mm, W= 300mm, H = 350mm
N. 2 NTC temperature probes (range -50 + +100 °C, +/-1 °C), (up tp 5 as option)
N. 1 amperometer (or wattmeter as option) to measure the current or power absorption (0-10A +/-1 f.s.)
N. 1 Schuko electric plugs 230 V, 50 Hz (other on demand)
N. 1 magnetics and thermics switch device
N. 1 safety connector
N. 1 RS485 port + C-Loop connector

Optional features

Nx. 1 Digital Input for Stop acquisition
N. 6 DIP switch to identify the acquisition box (up to 128)
Bar code reader (batch test)
Portable bar code reader for reading of acquisition box code-D.U.T.code and transmission to the control unit through suitable interface (batch test)



